



STRUCTURAL DESIGN

ENCLOSED BUILDING

EXPOSURE B

**MAXIMUM 30'-0" WIDE X 20'-0" EAVE HEIGHT- BOX EAVE
FRAME AND BOW FRAME**

18 December 2017

Revision 4

M&A Project No. 16022S/17300S

Prepared for:

**Tubular Building Systems, LLC
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Lake City, Florida 32025**

Prepared by:

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Digitally signed
by Wayne S
Moore
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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT		TUBULAR BUILDING SYSTEMS 30'-0"x20'-0" ENCLOSED BUILDING EXP. B PE SEAL COVER SHEET		
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	CLIENT: TBS		SHT. 1	DWG. NO: SK-3	REV: 4

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**TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXP. H**

DATE: 12-18-17

SHT. 2

SCALE: NTS

DWG. NO: SK-3

**JOB NO:
160225/173005**

REV: 4

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INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR A MAXIMUM 30'-0" WIDE X 20'-0" ENCLOSED BUILDING STRUCTURE.
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2007 FLORIDA BUILDING CODE (FBC) 6TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC) AND 2015 IRC.
3. DESIGN LOADS ARE AS FOLLOWS:
 A) DEAD LOAD = 10 PSF
 B) LIVE LOAD = 20 PSF
 C) GROUND SNOW LOAD = 0 PSF
4. LOW ULTIMATE WIND SPEED 105 TO 140 MPH (MINIMAL WIND SPEED 105 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 50 FT.
5. HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (MINIMAL WIND SPEED 109 TO 132 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 40 FEET.
6. LOW HAZARD PICK CATEGORY I (WIND)
7. WIND EXPOSURE CATEGORY B
8. SPECIFICATIONS APPLICABLE: 22 GAUGE METAL PANELS FASTENED DIRECTLY TO 2x12x2x12" 14 GAUGE TUBE STEEL (C) FRAMING MEMBERS FOR VERTICAL PANELS. 22 GAUGE METAL PANELS SHALL BE FASTENED TO 2x12x2x12" 14 GAUGE TUBE STEEL (C) FRAMING MEMBERS FOR VERTICAL PANELS. 22 GAUGE METAL PANELS SHALL BE FASTENED TO 2x12x2x12" 14 GAUGE TUBE STEEL (C) FRAMING MEMBERS FOR VERTICAL PANELS.
9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS: EXTERIOR = 5" (1" END = 6" (MAX)) INTERIOR = 5" (1" END = 6" (MAX))
10. FASTENERS CONSIST OF #12-14x3/4" DEEP DRILLING FASTENER (DDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS. SPECIFICATIONS APPLICABLE ONLY FOR ROOF PITCHES OF 12:12 OR LESS, AND ROOF SLOPES OF 14:12 (3:12 PITCH) OR LESS. SPACING REQUIREMENTS FOR OTHER ROOF PITCHES AND/or CLIMATES MAY VARY.
11. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITH MINIMUM 1" GUTTER RAIL COLUMN ALONG SIDES.
12. GROUND ANCHORS SHALL CONSIST OF #4 REBAR WELDED NOT TO BE LUMPED IN SUITABLE SOIL FUNDING MAY BE USED FOR LOW WIND SPEEDS (105 MPH NOMINAL WIND SPEED) OR OPTIONAL ANCHORAGE MAY BE USED IN LUMPED SOILS AND MUST BE USED IN UNDESIRABLE SOILS AS NOTED.
13. MINIMUM BASE RAIL ANCHORAGE MAY BE USED FOR LOW AND MUST BE USED FOR HIGH WIND SPEEDS.
14. WIND SPEEDS GOVERN OVER DESIGN LOADS. CLIMATIC PARAMETERS ANALYZED ARE:
 SOIL SITE CLASS = D
 RISK CATEGORY I/II/III
 R = 0.25
 C_{dir} = 0.92
 C_{ex} = 0.839



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30'-0" X 20'-0" ENCLOSED BUILDING EXP. B**

DATE: 12-18-17

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16022S/17300S**

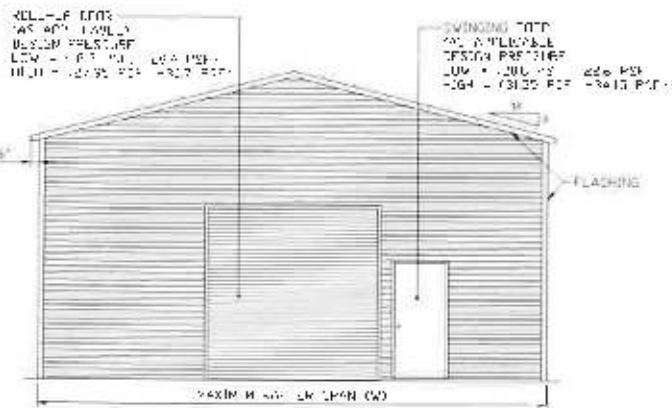
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DWG. NO: SK-2

REV.: 4

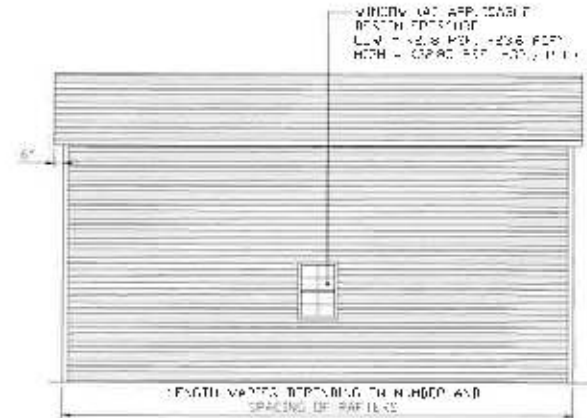
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BOX EAVE FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION-HORIZONTAL ROOF

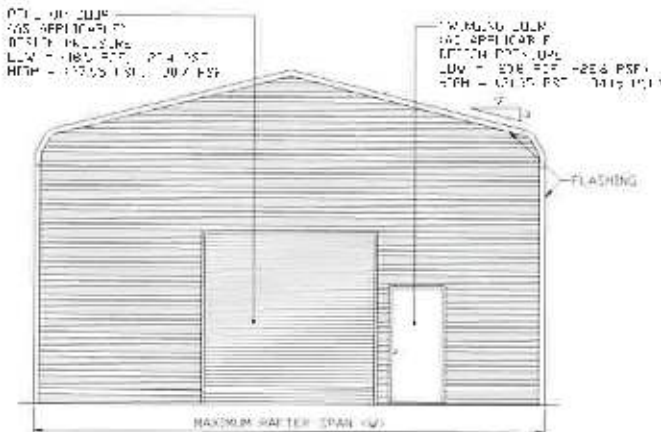
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TYPICAL SIDE ELEVATION-HORIZONTAL ROOF

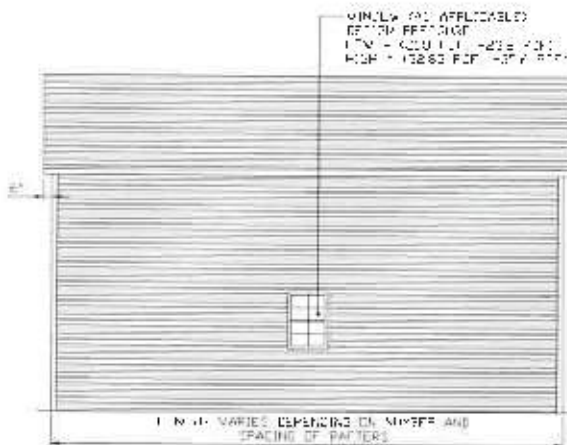
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BOW FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION

SCALE: NTS



TYPICAL SIDE ELEVATION

SCALE: NTS



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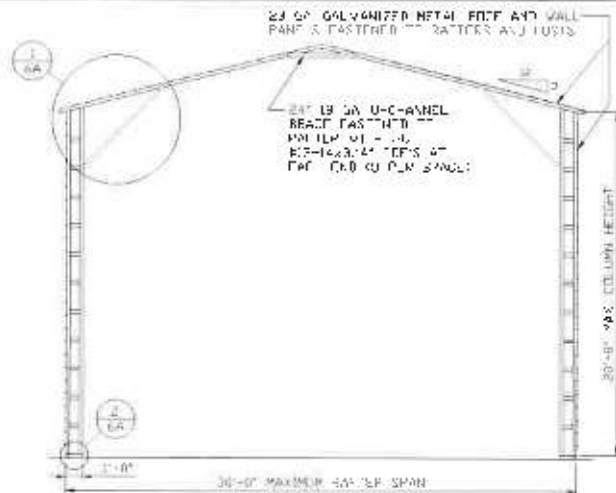
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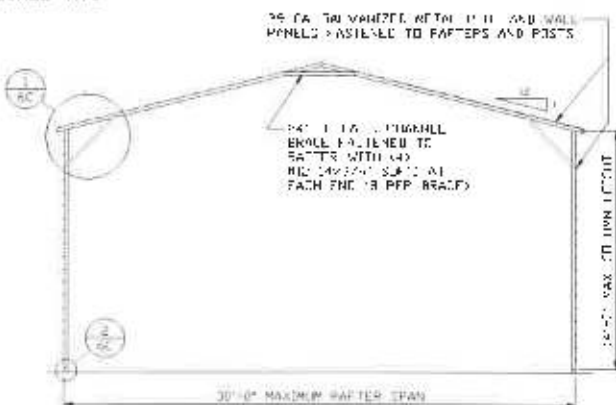
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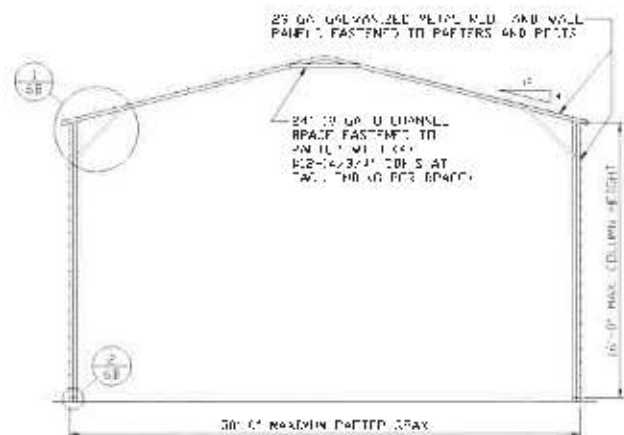
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



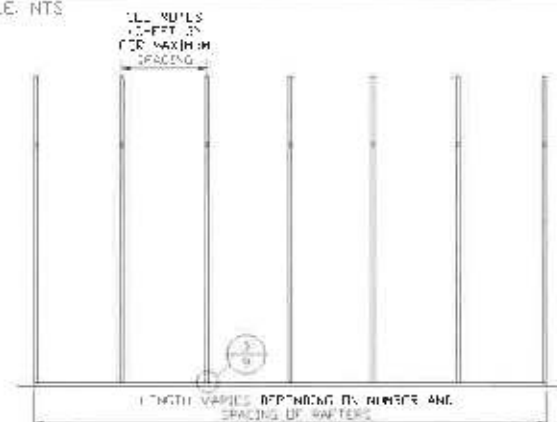
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SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS



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**TUBULAR BUILDING SYSTEMS
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SHT. 5

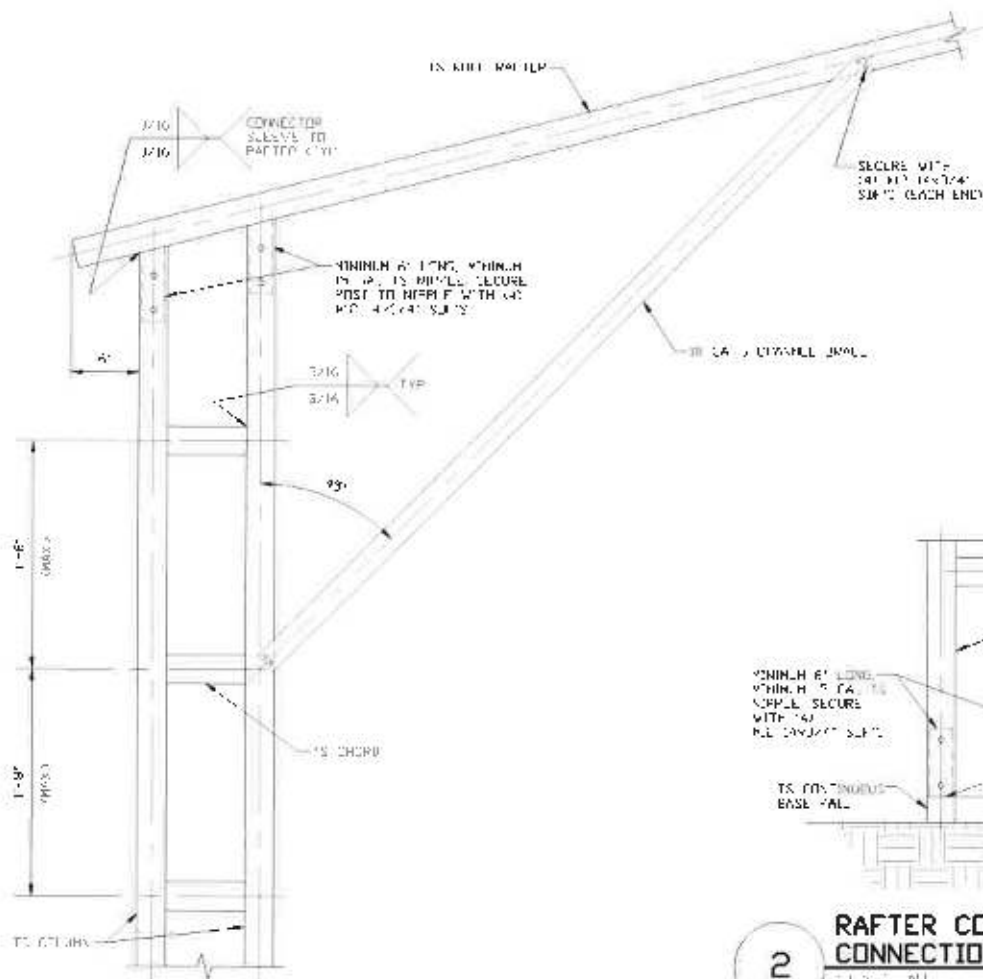
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160225/17300S

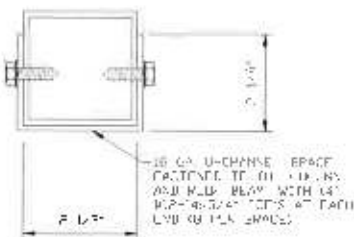
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**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 16'-0" < TO ≤ 20'-0"**

SCALE: NTS



BRACE SECTION

SCALE: 1/2\"/>

**2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL**

SCALE: NTS



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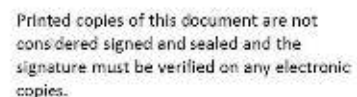
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**JOB NO:
160223/173003**

SHT. 6A

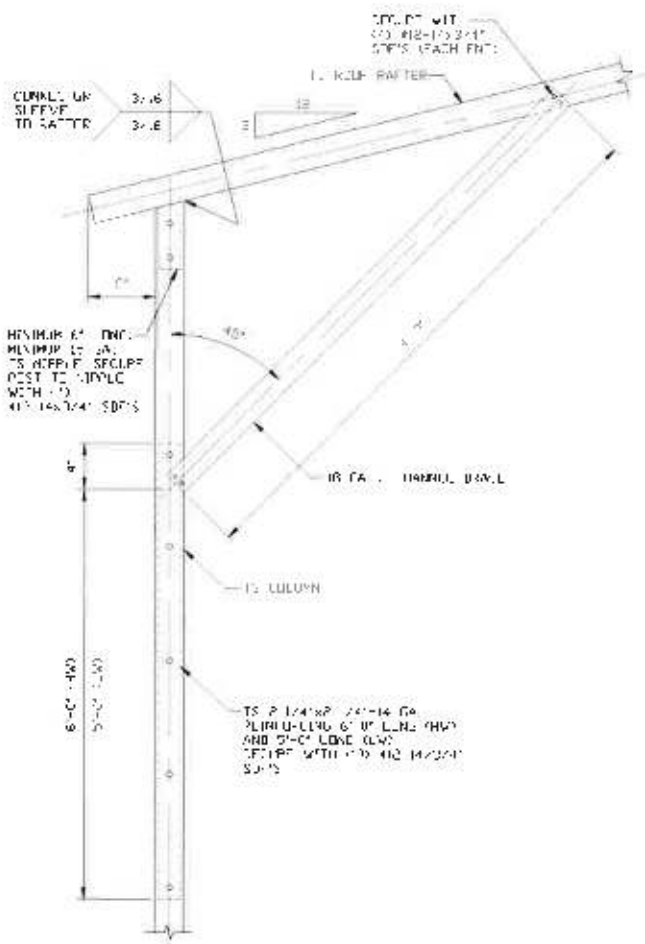
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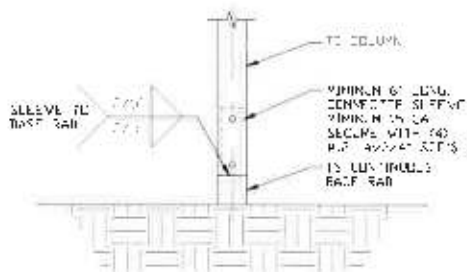
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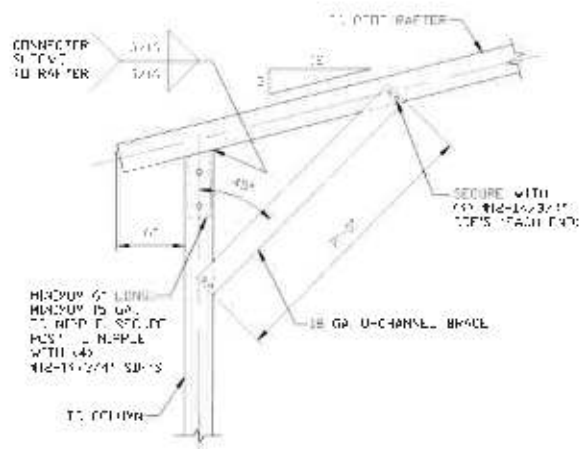
1A

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 10'-0" < TD ≤ 14'-0"**
SCALE: NTS



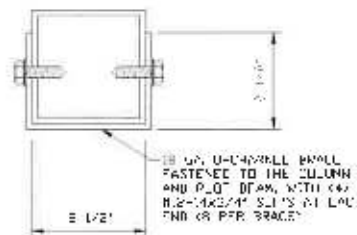
2

**RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL**
SCALE: 1/4" = 1'-0"



1B

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS ≤ 10'-0"**
SCALE: NTS



BRACE SECTION
SCALE: 1/4" = 1'-0"



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**TITULAR BUILDING SYSTEMS
30'-0" x 20'-0" ENCLOSED BUILDING EXP. B**

DATE: 12-19-17

SHT. 6C

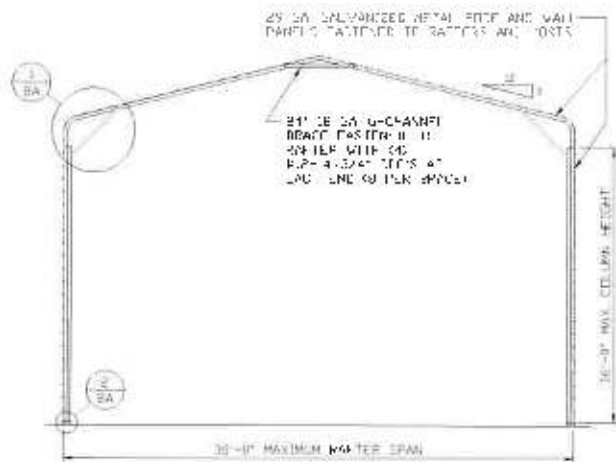
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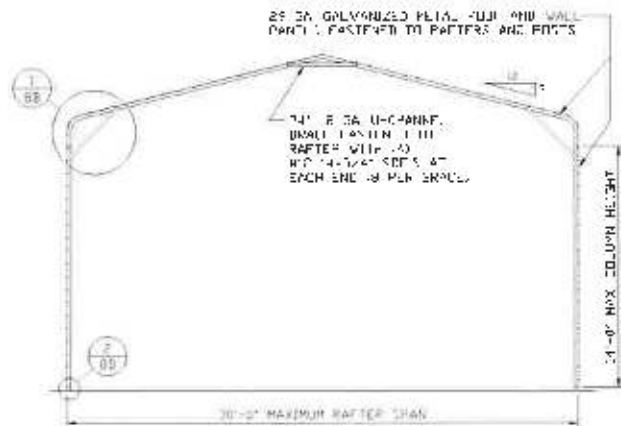
**JOB NO:
160225/173085**

REV: 4

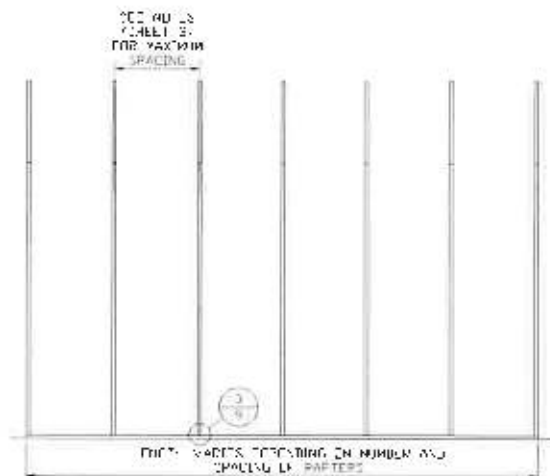
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TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS



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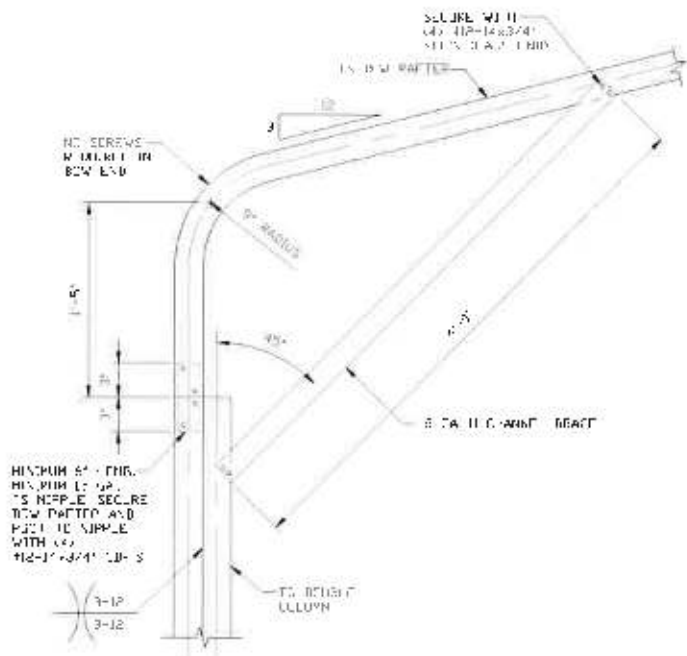
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160225/173005**

SHT. 7

DWG. NO: SK-3

REV: 4

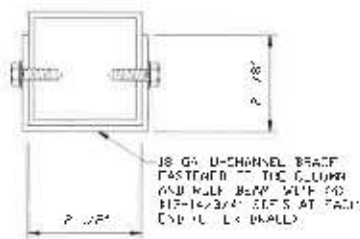
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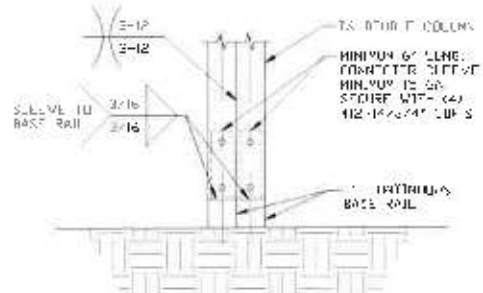
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 14'-0" < TO ≤ 16'-0"

SCALE: NTS



BRACE SECTION

SCALE: NTS



2

RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



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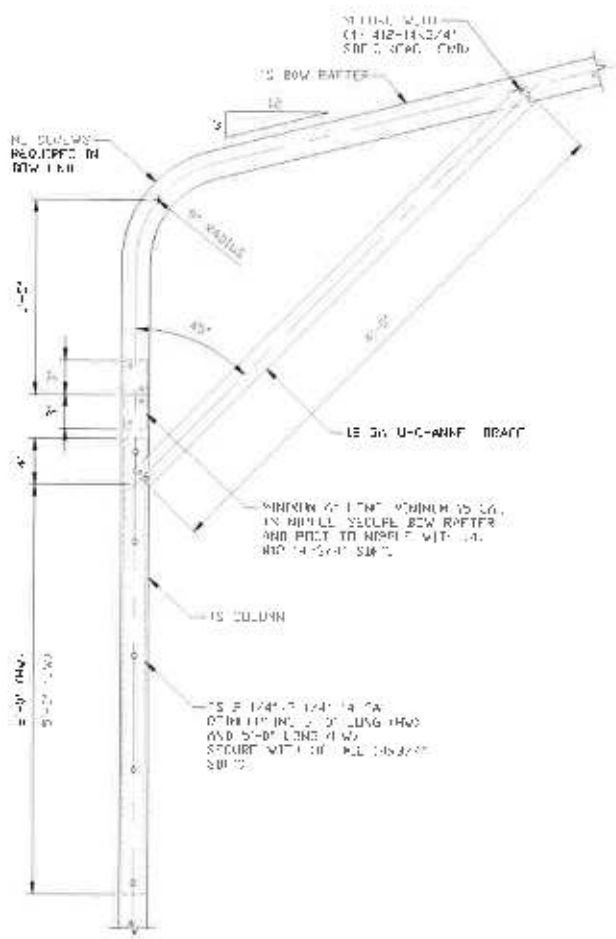
JOB NO:
160225/173005

SHT. 8A

DWG. NO: SK-3

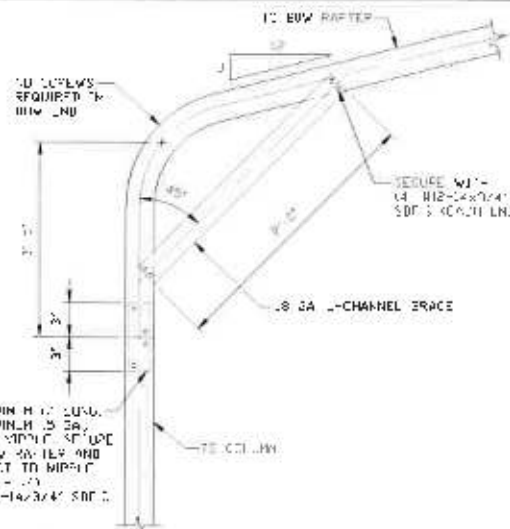
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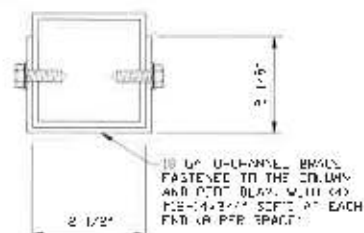
1A

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 10'-0" < TO ≤ 14'-0"**
SCALE: NTS

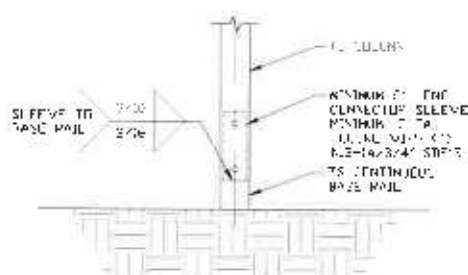


1B

**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS ≤ 10'-0"**
SCALE: NTS



BRACE SECTION
SCALE: NTS



2

**RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL**
SCALE: NTS



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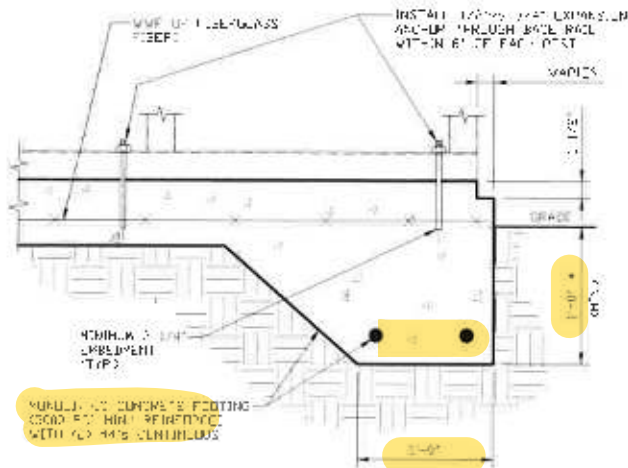
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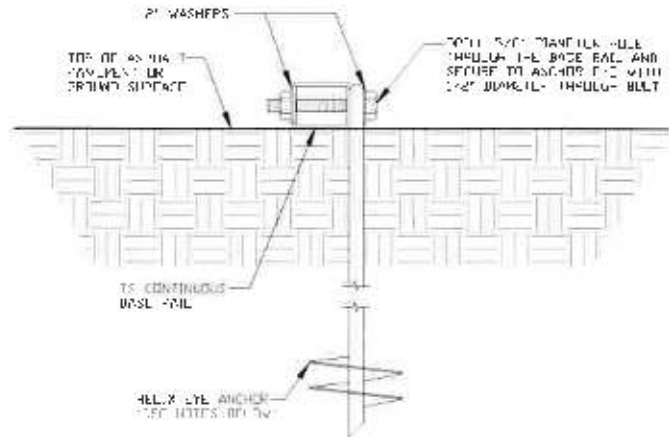
BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED



3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
MINIMUM ANCHOR LENGTH DISTANCE TO 4\"/>



3B

GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)

GENERAL NOTES

CONCRETE:

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL:

THE THICKNESS OF MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE 1 1/2\"/>

3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EFFECTS OF WEATHER AND 1 1/2 INCHES ELSEWHERE.

REINFORCING STEEL:

THE TOPDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCING SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR TUBULARS WITH REINFORCEMENT.

REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

1. REINFORCEMENT IS BENT CORRECTLY.
2. DIAMETER OF THE BEND MEASURED IN THE FIELD IN THE BAR IS NOT LESS THAN SIX-BAR DIAMETERS.
3. REINFORCEMENT, ESPECIALLY EXPOSED IN CONCRETE SHALL NOT BE FIELD BENT.

HELIX ANCHOR NOTES:

1. FOR VERY DENSE AND/OR COMPACTED SANDS, COARSE GRAVEL, AND COE'S SAND, OR OTHER FILL, USE MINIMUM (2) 4\"/>
2. FOR DURAL USE MINIMUM (2) 4\"/>
3. FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVEL, VERY SILTY SAND, AND CLAYS USE MINIMUM (2) 4\"/>
4. FOR LOOSE TO MEDIUM DENSE SANDS, FILL, ALLUVAL FILL, AND SILTY SAND, ALLUVAL FILL USE MINIMUM (2) 4\"/>
5. FOR VERY LOOSE TO MEDIUM DENSE SANDS, FILL, ALLUVAL FILL, AND SILTY SAND, ALLUVAL FILL USE MINIMUM (2) 4\"/>



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TUBULAR BUILDING SYSTEMS
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DATE: 12-18-17

SHT. 9A

SCALE: NTS

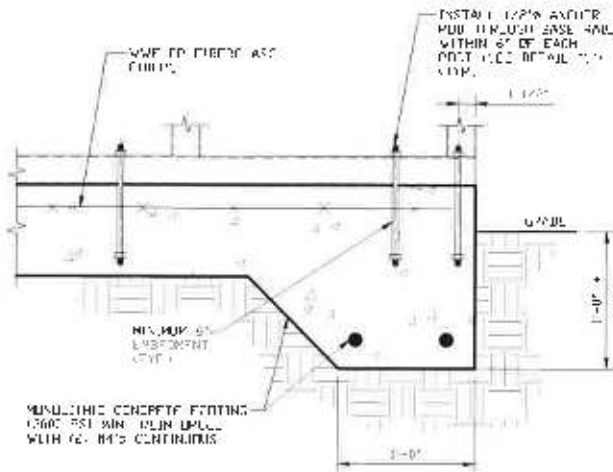
DWG. NO: SK-3

JOB NO:
1602RS/173005

REV: 4

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OPTIONAL FOUNDATION ANCHORAGE FOR LOW & HIGH WIND SPEED

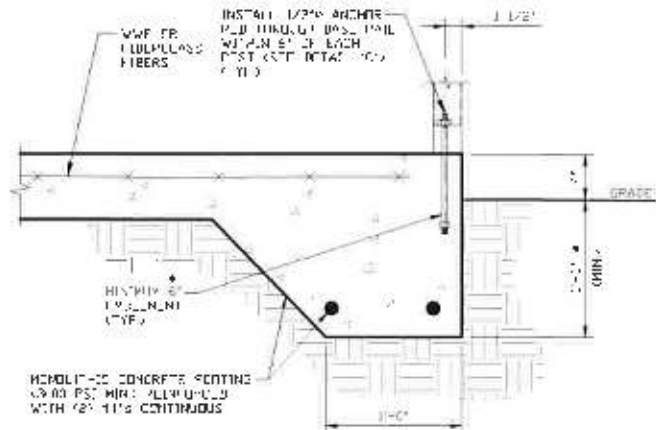


1A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR LODGE DISTANCE IS 1 1/2"
* COORDINATE WITH LOCAL CODES/CFI



1B

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR LODGE DISTANCE IS 1 1/2"
* COORDINATE WITH LOCAL CODES/CFI

GENERAL NOTES

CONCRETE

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSION STRENGTH OF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING STEEL SHALL BE PER ACI-308.

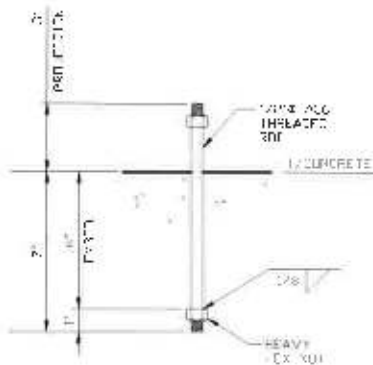
3 INCHES IN THICKNESS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EARTH OR WEATHER, AND 1 1/2 INCHES ELSEWHERE.

REINFORCING STEEL

THE MINIMUM REINFORCING STEEL SHALL BE AS Y AND FR 60. ALL SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM AND FR FIBERGLASS FIBER REINFORCEMENT.

REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

1. REINFORCEMENT IS BENT 90 DEGREES.
2. THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BEND, IS NOT LESS THAN SIX-BAR DIAMETERS.
3. REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE BENT 180 DEGREES.



1C

ANCHOR ROD THROUGH BASE RAIL DETAIL

SCALE: NTS



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CHECKED BY: PDI

PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXP. B

DATE: 12-18-17

SCALE: NTS

JOB NO:

16022S/17300S

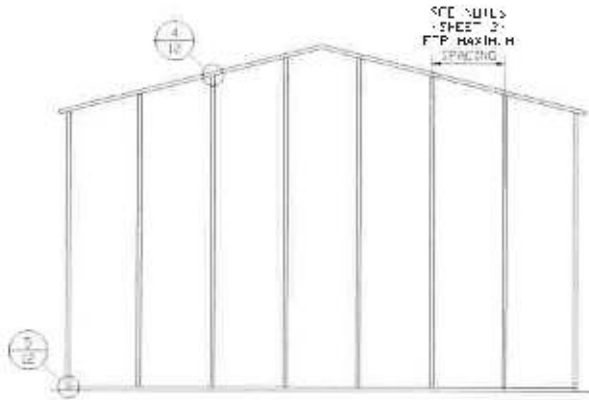
SHT. 9B

DWG. NO: SK-3

REV: 4

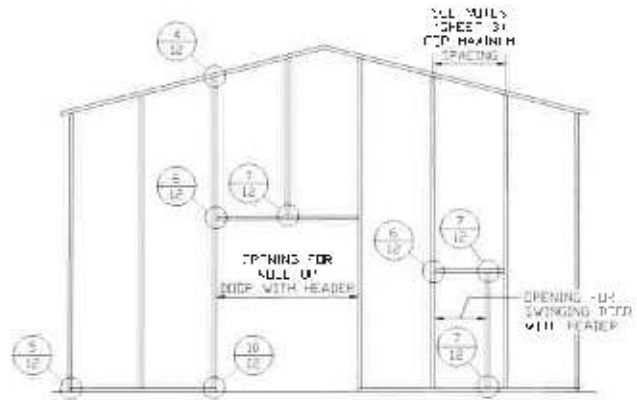
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



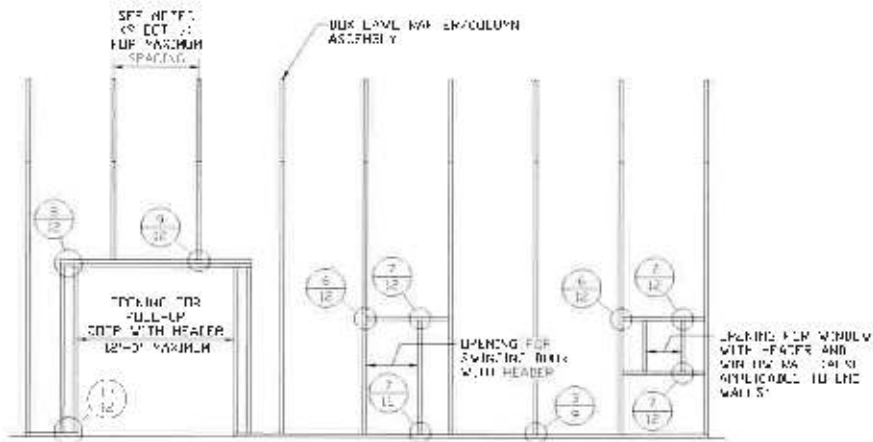
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: 1/2"



**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE: NTC



**TYPICAL BOX EAVE RAFTER SIDE
WALL OPENINGS FRAMING SECTION**

SCALE: NTC



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DRAWN BY: LT

CHECKED BY: PDH

PROJECT MGR: VSM

CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXP. B**

DATE: 12-18-17

SHT. 10

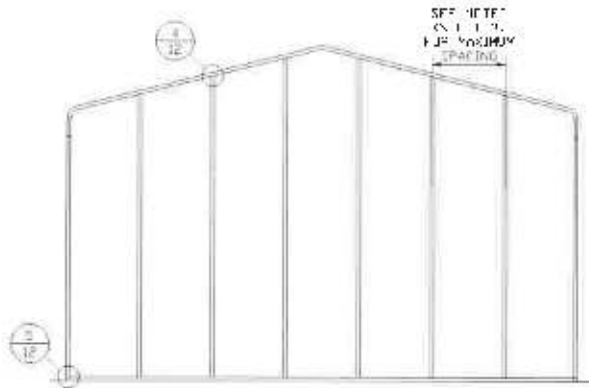
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DWG. NO: SK-3

**JOB NO:
160223/17300S**

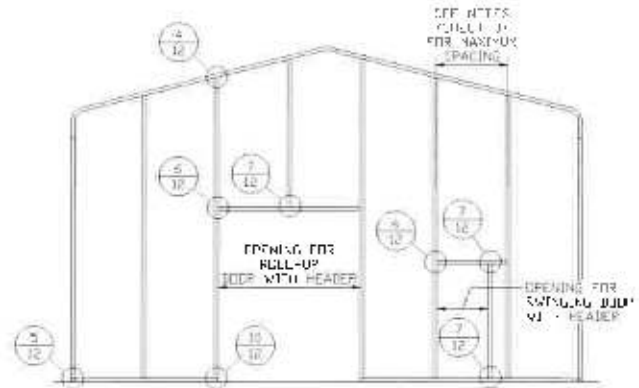
REV: 4

BOW RAFTER END WALL AND SIDE WALL OPENINGS



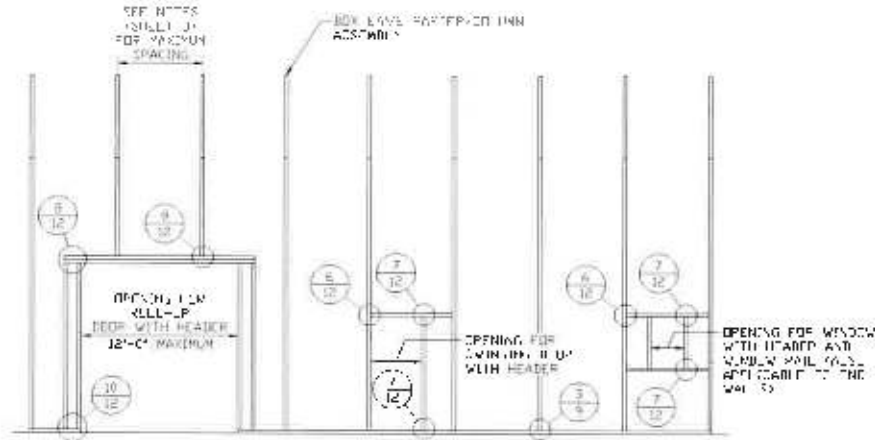
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE: N.T.S.



**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE: N.T.S.



**TYPICAL BOX EAVE RAFTER SIDE
WALL OPENINGS FRAMING SECTION**

SCALE: N.T.S.



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
30'-0" x 20'-0" ENCLOSED BUILDING EXPI. B**

DATE: 12-18-17

SHT. 11

SCALE: N.T.S.

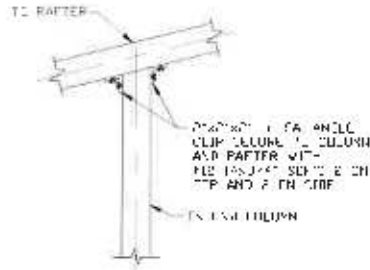
DWG. NO: SK-3

**JOB NO.
160825/173005**

REV: 4

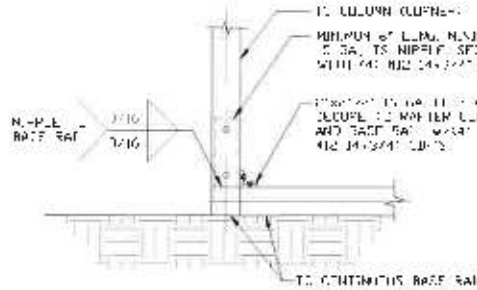
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BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



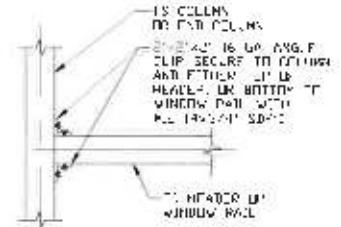
4 END COLUMN/RAFTER CONNECTION DETAIL

SCALE: NTS



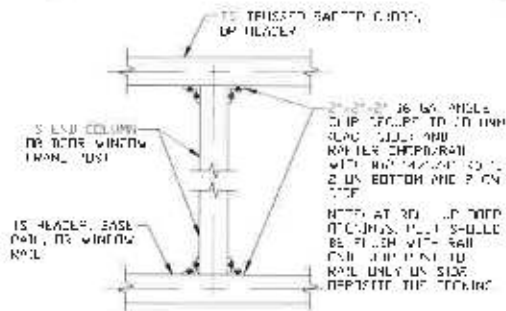
5 END COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



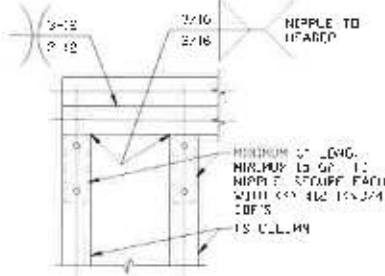
6 HEADER OR WINDOW RAIL TO COLUMN CONNECTION DETAIL

SCALE: NTS



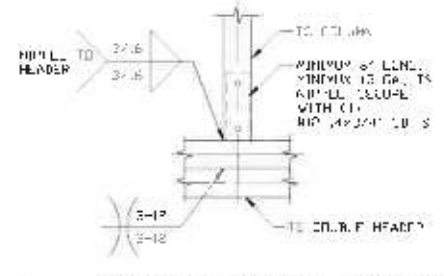
7 COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL

SCALE: NTS



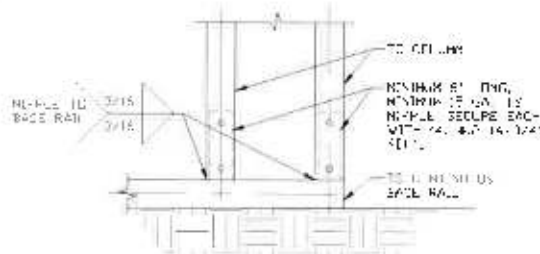
8 DOUBLE HEADER/COLUMN CONNECTION DETAIL

SCALE: NTS



9 COLUMN/DOUBLE HEADER CONNECTION DETAIL

SCALE: NTS



10 COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



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CLIENT: TBS

TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXP. B

DATE: 12-18-17

SHT. 12

SCALE: NTS

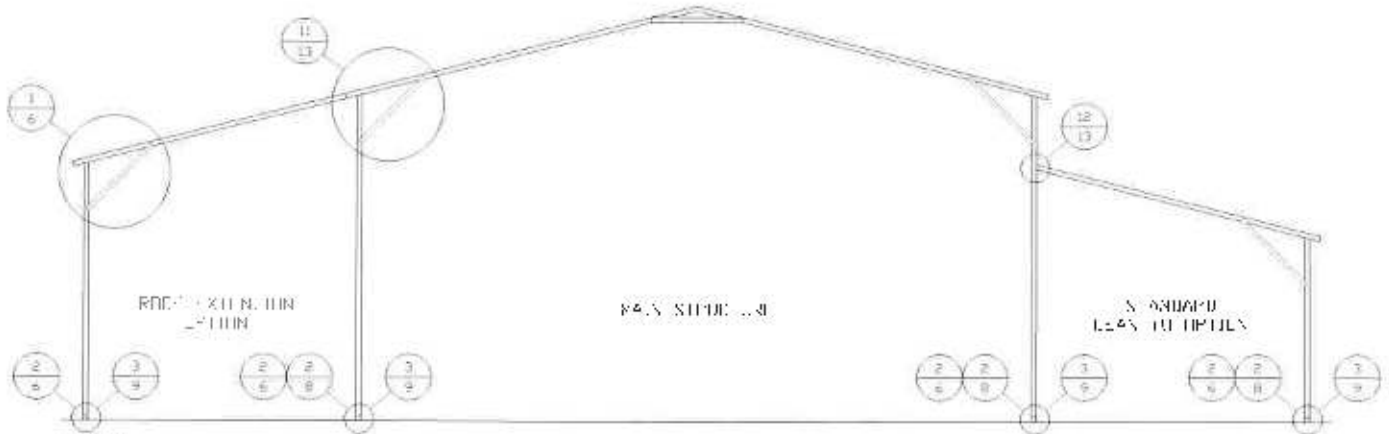
DWG. NO: SK-3

JOB NO:

160225/173005

REV: 4

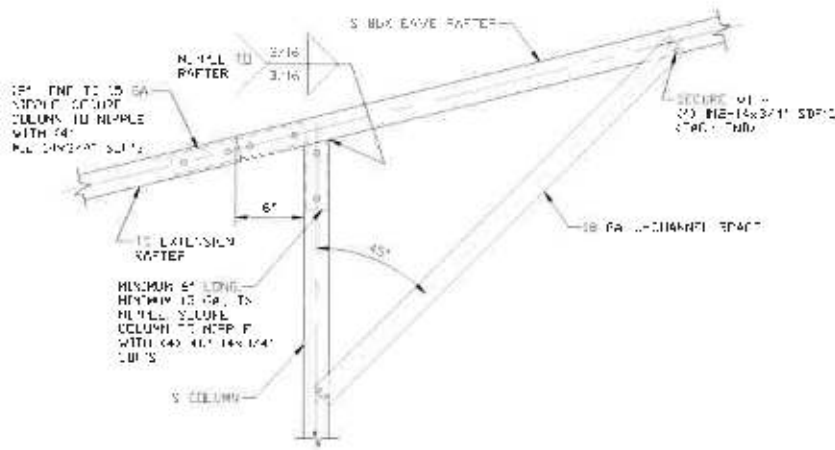
BOX EAVE RAFTER LEAN-TO OPTIONS



TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

SCALE: NTS

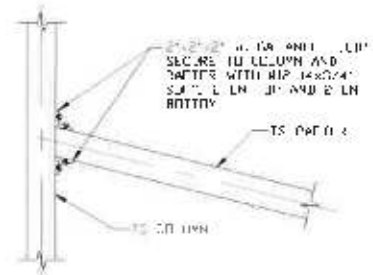
MAXIMUM WIDTH OF SINGLE MEMBER RAFTER (AN ALL IS 16'-0")



11A

SIDE EXTENSION RAFTER/COLUMN DETAIL

SCALE: NTS



12

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

SCALE: NTS



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TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXPI. B

DATE: 12-18-17

SHT. 13

SCALE: NTS

DWG. NO: SK-3

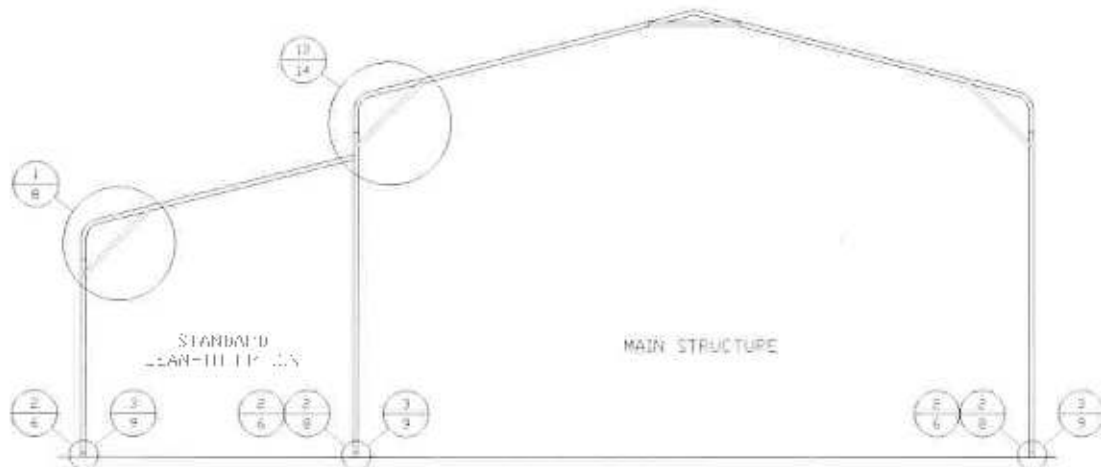
JOB NO:

160225/173005

REV. 4

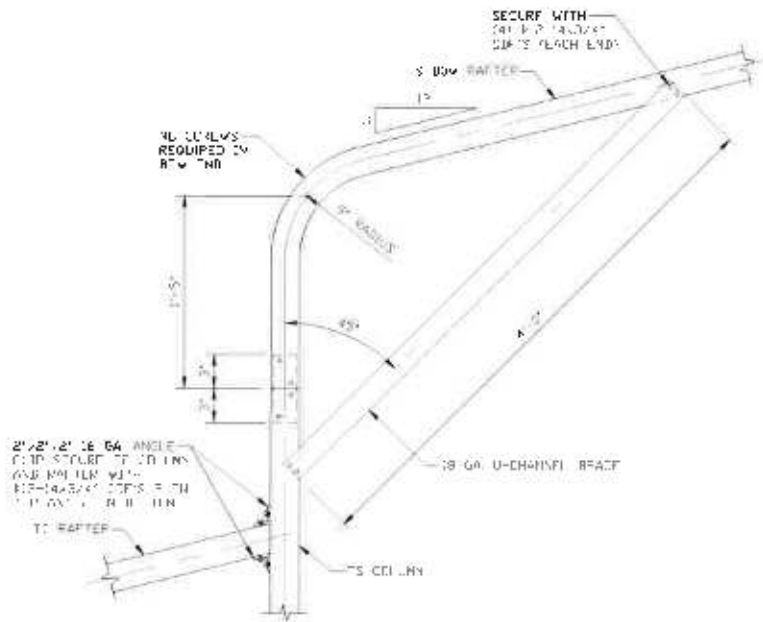
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BOW RAFTER LEAN-TO OPTIONS



TYPICAL BOW RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

SCALE: NTC
 MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 10' 0"



13

SIDE EXTENSION RAFTER/COLUMN DETAIL

SCALE: NTC



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TUBULAR BUILDING SYSTEMS
 30'-0"x20'-0" ENCLOSED BUILDING EXP. B

DATE: 12-18-17

SHT. 14

SCALE: NTS

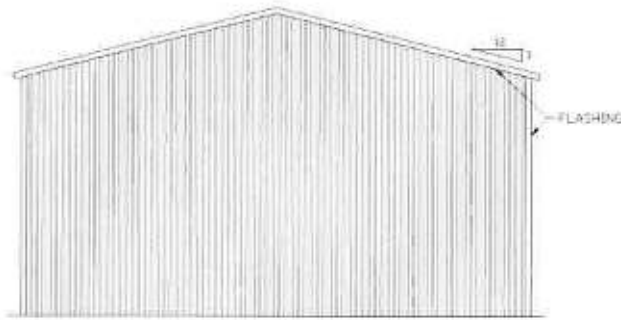
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JOB NO:
 160225/173005

REV. 4

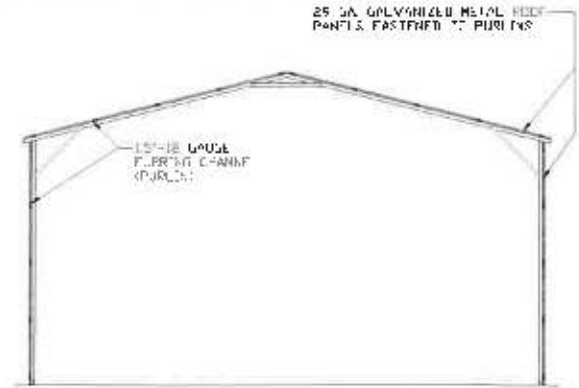
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



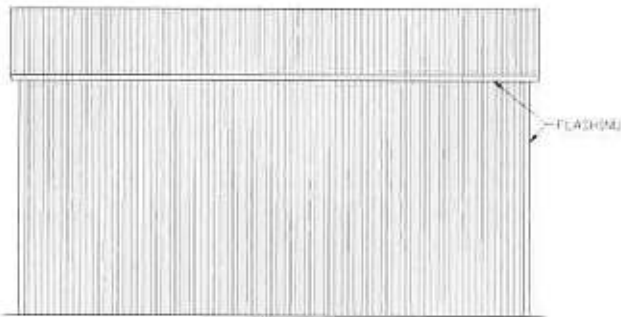
**TYPICAL END ELEVATION
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



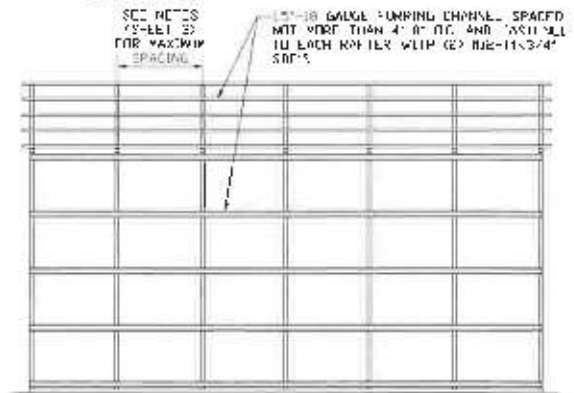
**TYPICAL SECTION VERTICAL
ROOF/SIDING OPTION**

SCALE: NTS



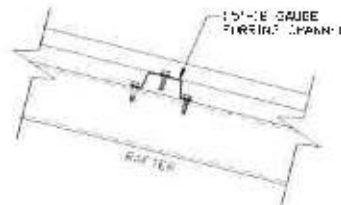
**TYPICAL SIDE ELEVATION
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



**TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



ROOF PANEL ATTACHMENT

(6.11.18) (FOR VERTICAL ROOF PANELS)
SCALE: NTS



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**TUBULAR BUILDING SYSTEMS
30'-0"X20'-0" ENCLOSED BUILDING EXP. B**

DATE: 12-18-17

SHT. 15

SCALE: NTS

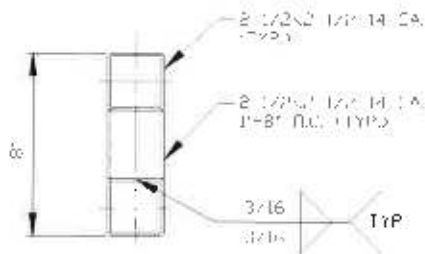
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**JOB NO:
166223/173005**

REV: 4

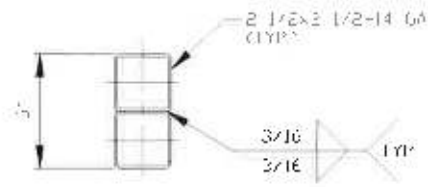
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OPTIONAL DOOR HEADER



**HEADER DETAIL FOR DOOR
OPENINGS 12'-0" < LENGTH ≤ 15'-0"**

SCALE: NTS



**HEADER DETAIL FOR DOOR
OPENINGS LENGTH ≤ 12'-0"**

SCALE: NTS



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
30'-0"x20'-0" ENCLOSED BUILDING EXP. B**

DATE: 12-19-17

SHT. 16

SCALE: NTS

DWG. NO: SK-3

**JOB NO:
16022S/17300S**

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